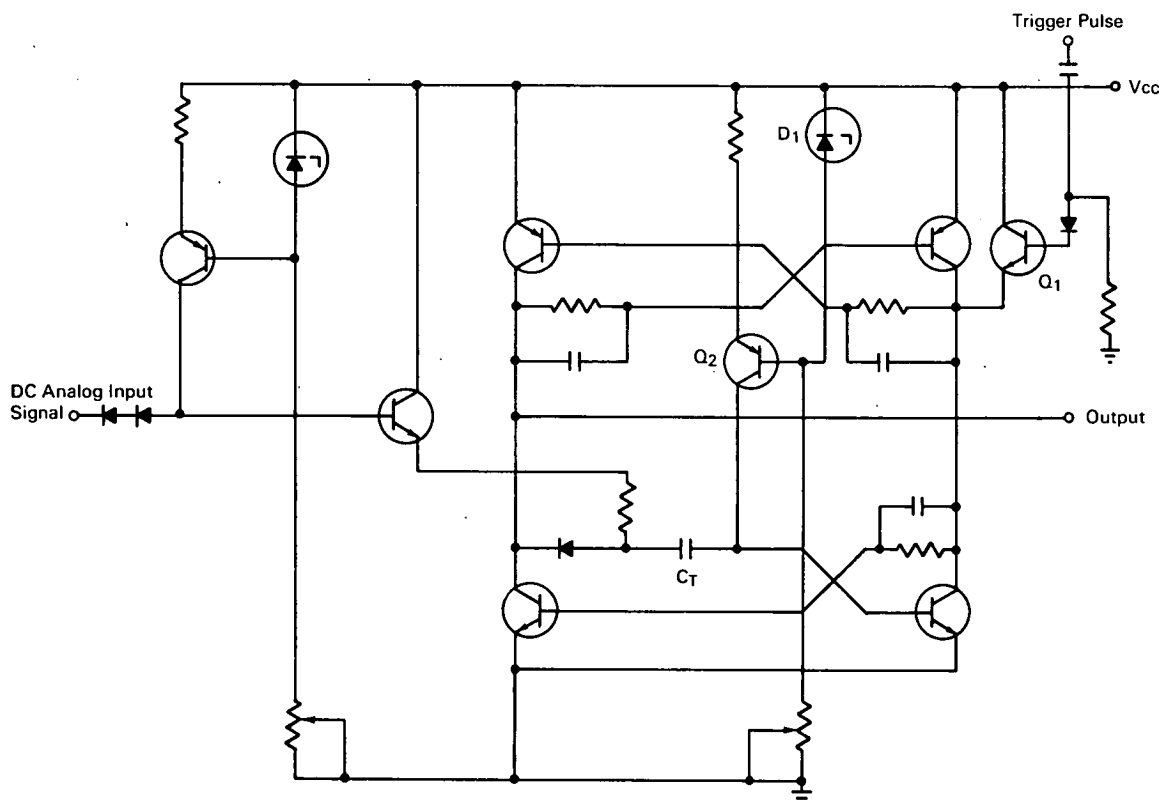


# NASA TECH BRIEF



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## Linear Analog DC Voltage-to-Pulse-Width Converter



This circuit converts a dc analog input signal (0 to 5 volts) to pulse widths that are proportional to the input signal voltage. The circuit represents an improvement over previous pulse-width converters with regard to design simplicity, efficiency, linearity, accuracy, and temperature stability.

The converter consists of a complementary monostable flip-flop controlled by the constant-current discharge of the temperature compensated capacitor  $C_T$ . This capacitor is charged by the analog input

signal. A trigger pulse through  $Q_1$  initiates a linear discharge of  $C_T$  through the constant current generator  $Q_2$  and zener diode  $D_1$ . The complementary flip-flop operates for one complete cycle with a period (pulse width) proportional to the dc analog input voltage.

### Notes:

1. The linearity of this circuit is relatively independent of temperature variations over a range from  $-20^\circ$  to  $70^\circ\text{C}$ . Its power drain is less than 100 milliwatts.

(continued overleaf)

2. The circuit would be particularly useful as an analog-to-digital converter where low power, ruggedness, reliability, and good linearity are prime requirements.
3. Inquiries concerning this circuit may be directed to:

Technology Utilization Officer  
Goddard Space Flight Center  
Greenbelt, Maryland 20771  
Reference: B68-10003

**Patent status:**

No patent action is contemplated by NASA.

Source: W. R. Crockett  
(GSFC-556)